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SCIENCE AND TECHNOLOGY

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WEST EUROPE REPORT
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AEROSPACE

FRG WANTS ARIANE V TO BE ABLE TO LAUNCH MANNED VEHICLES

Munich FLUGREVUE in German Oct 84 pp 8-14

[Article by Goetz Wange: "Title Subject: Europeans Pin Hopes on Super-Ariane"]

[Text] Europe's rocket manufacturers have submitted their journeymen's product. Future developments will reveal whether they will obtain their master's certificate. But even those critics who predicted that the Ariane program would suffer the fate of the Europe rocket will probably give European manufacturers good grades (the European rocket was the first--and unsuccessful--attempt to establish an independent European space program.) A very important reason for this is that a major obstacle on the road to success was surmounted at the 10th launching on 4 August. It was the first launching of an Ariane 3 carrier rocket, which apart from other technological improvements over the basic model was strengthened by two small solid-fuel boosters and can now move 800 kilograms more in the transitional course on the way into permanent orbit around the earth.

Flexible Price Policy in the Struggle for Market Shares

Increasing the service-load capacity means competitiveness and success on the market. Americans are galled by the fact that, in this calculation, the Europeans at present come off better than the two American carriers, usable only one time, namely the Delta 3920-PAM, which can put 1,300 kilograms in transfer orbit for 29 million dollars, and the Atlas-Centaur, which can send up a payload of about 2,500 kilograms for 43 million dollars. The marketing firm for the Thor Delta, Transspace Carriers, Inc (TCI), established as the counterpart to Arianespace, even filed a complaint with the United States Department of Commerce regarding the price policies of the Europeans, who are vigorously trying to expand their share of the American market. The allegation: Arianspace is hunting customers in the United States by unacceptable means, since it is making special offers that 25 to 33 percent lower than the amount that clients from ESA member states are being charged.

But Dr Klaus Iserland, a manager at the European marketing company, counters, "We have never concealed the fact that we are going to pursue a different price policy in the first 3 years. Besides, we also want healthy conditions to be created; by that, we mean the government subsidies granted the American space shuttle." For NASA is being just as flexible in its offers;

a comparable price for putting a satellite in transfer orbit, therefore, is difficult to determine. However, the extent of the subsidy becomes obvious when one knows that the U. S. air and space agency is charging 88 million marks till the end of next year for a complete launching of a shuttle into a low earth orbit (300 kilometers) and that the figure is rising all the way to 168 million in 1986.

Arianespace has already lost an American client on account of these special offers. Western Union switched its contract for Westar 6, originally intended for Ariane, to the shuttle. Ironically, in February the Hughes satellite went into the wrong orbit the same way as the Indonesian Palapa B-2, because the carrier stage PAM-D, which was to catapult the satellites from their low shuttle orbit into geosynchronous orbit at an altitude of 36,000 kilometers above the equator, did not perform as desired. This failure and the explosion of an Atlas-Centaur rocket, which was to take an INTELSAT up into the universe, shook the confidence of clients in U. S. transportation systems and brought about a boom in the demand for Ariane, which has become known as extremely reliable.

At the moment Ariane's business schedule involves 30 satellites, which are to be put in place in 19 launches. Among further reservations, five payloads--e.g., the two German Copernicus mail satellites--are regarded as safe for Ariane. It is interesting to note that the Chinese, too, have made a reservation for their Chinese Broadcasting Satellite (1987/88).

Parallel to this market success, the development of the Ariane is proceeding logically. For communications satellites are continuously improving their performance, but also becoming heavier and heavier. The carrier must be adjusted accordingly. An example: the Hughes Satellite INTELSAT VI, which is to begin functioning at the beginning of 1986, offers with its 33,000 telephone and 4 television channels not only twice as much broadcasting capacity as its predecessor, but also with its 2243 kilograms will weigh twice as much.

End of Expandability Now Reached

For this class European industry is producing Ariane 4, which can place 4,200 kilograms in transfer orbit. While Ariane 3 can transport payloads with a diameter of only up to 3 meters, model 4 will be able to cope with 3.7 meters. SYLDA, which thus far had the highest payload capacity--it was able to accommodate two satellites at one time--is being replaced SPELDA, a double-launch structure whose height is up to 4.4 meters.

The name Ariane 4 stands for an entire family of carrier rockets which can be custom-equipped with additional rockets (boosters) upon the wishes of the customer. In between, one can order all imaginable pairings of solid- and liquid-fuel boosters. The ESA had to enlarge its launching installations in Kourou, French Guyana, not only because of the growing frequency of launches, but also because of the great heights of the rockets. The costs of ELA-2, including a new complex of buildings designated as "Launching Center", amount to roughly DM 400 million. The new installations can be utilized to attach carriers with a height of up to 60 meters; an expansion for rockets whose height is up to 85 meters is possible. ELA-2 is thus compatible with all versions of Ariane on the basis of the first stage of the AR 44L. The expansion is almost finished, and plans are already being made for a third launching complex.

Thus the South American launching area was woken up for good from its long sleep into which it seemed to sink forever after the fiasco with the Europe rocket. The area is truly ideal for launching communications satellites because it is closer to the equator than, for example, Cape Canaveral and thus makes entries into geosynchronous orbits easier and less expensive.

Ariane Launch Plan

Date	Type	Payload
1984:		
November 9	3	Marecs-B2, Gstar-1
December	3	Arabsat, Spacenet-2
1985:		
January	3	Telecom-1B, Gstar-1B
March	3	SBTS-1, Spacenet-3
May	2	Spot-1 or Intelsat-V
July	1	Giotto
August	3	SBTS-2, ECS-3
September	2	TV-Sat
October	2	Spot-1 or Intelsat-V
November	2	TDF-1
1986:		
January	2	Intelsat-Va
March	4	Ariane-4-01
May	2	Intelsat-Va
June	3	F. O.
August	4	Unisat-1 (R) + F. O.
November	3	STC(R) + F. O.
December	4	Intelsat-VI
1987:		
February	4	Tele-X + Unisat-2(R)
March	3	DBSC-1(R)
April	4	Intelsat-VI(R)

Date	Type	Payload
May	3	TDF-2(R)
June	4	DFS-1(R) or Anik(R) + Meteosat OP-1
July	3	L-Sat Olympus
August	4	Intelsat-VI(R)

R = Reservation
F. O. = Flight opportunity available

Ariane 5 for Manned Space Flight Too

Experts expect there to be geosynchronous satellites with masses of 4 to 5 tons in the mid-90s. To meet these demands, the "Super Ariane", modestly labeled version 5 in the planning papers, is being developed. As the main financiers within the framework of the ESA, the French and the Germans are in agreement on the necessity for this, so that the development program, whose cost is estimated at DM6 to 8 billion, is as well as decided. First, in June the ESA council gave the green light for the hydrogen engine HM-60, which is playing a significant role in all the configurations of Ariane 5 currently under discussion.

A look at the transportation costs reveals how important the new generation of Ariane is for the Europeans in their struggle for their share of the market. Dr Klaus Iserland says, "In the case of Ariane 3, the costs of putting payloads in geosynchronous orbit are at present about DM 105,000 marks per kilogram of payload; the figure for the AR 44L will probably be about DM 75,000 marks." Experts expect the shuttle and its variations to incur far lower expenses in putting payloads in earth orbit. In the strategic study that the German Institute for Aeronautics Research and Experimentation (DEVER) produced for the Federal Government, scientists conclude: "By 1995 at the latest, use of the shuttle in putting payloads in earth orbit will be preferable to Ariane 4." To remain competitive, a carrier is required that would enable the cost of transporting 1 kilogram of payload to be reduced to DM 50,000 and below.

Ariane 5P is clearly favoered by the French space agency CNES. The P stands for "poudre" ("powder") and refers to two huge additional 170-ton solid-fuel rockets which supplment the central cryogenic 120-ton stage, which is 5 meters thick in diameter. The Germans are criticizing this suggestion because in addition to the HM-60 engine, the two large solid-fuel boosters would have to be developed from scratch, and because this is hardly reconcilable with the marginal issues of financing. However, another aspect of the French design is more serious. Their concept rules out the eventual reuse of the first stage, whose purpose would be to cut costs. The central stage is lost in space, and the recovery of the solid-fuel booster--as can be learned from the shuttle program--hardly reduces costs.

One of the German recommendations stands out as especially future-conscious, namely making the second stage and the module of the first stage identical. That would mean far lower development costs. It leaves open the matter of later reusing the first stage.

Considering the American competition, there are some interesting possibilities of arriving at interim solutions. For example, the first step might be the construction of a small cryogenic second stage with a HM-60 engine; this stage could then be flown on the available first stage of Ariane 44L without any modifications being needed. This interim solution, with its 13 tons for a low earth orbit as opposed to 15, with its 3.5 tons for the geosynchronous orbit as opposed to 4 to 5, is just slightly below the goals of the Ariane 5 project.

The next step might be to combine four of these small cryogenic upper stages into a single efficient first stage, so that in the year 2000 there would be an Ariane 5 able to perform at full capacity. This would be sufficient to launch a Euroshuttle--the French have submitted their Hermes project--into a low earth orbit.

In addition to the French and German suggestions, there is a study conducted by the ESA that raises questions about future carrier systems which must be considered in choosing one or the other solution even if one is dealing with a generation that will follow Ariane 5. The recover of the expensive first stage plays a major role here. The idea is to equip the Ariane stage with two laterally attached airplane engines as well as with a tall unit that will enable the complete stage to be returned to the launching site by remote control after burnout.

The Federal Republic also wishes Ariane to become a carrier that will be capable of launching manned space vehicles. Because of the demands for dependability, the costs of developing the HM-60 engine, which are at present estimated at about DM 1.5 billion, would almost double if 99.5 percent reliability had to be achieved.

A developmental philosophy similar to the one worked out for the U.S. shuttle has been recommended in order for costs to be cut. In the American case, the astronauts were protected with ejector seats until the required degree of dependability could be demonstrated. The French Euroshuttle plan Hermes also provides for a system of ejector seats.

The decision to develop the "key engine" HM-60, which is absolutely necessary for the continued development of Ariane, has temporarily brought peace to the discussion front. The ESA is going to contrast national studies with European ones. Only then will we know what course the development of the European carrier rocket will take.

PHOTO CAPTIONS

1. p 9. Both the development and the marketing of Ariane as a carrier rocket for communications satellites are proving successful. American competitors are stunned. But from a technical point of view, the present direction of matters will make Ariane end up in a dead-end road. A super-Ariane, of which there is as yet no single agreed upon conception, is in the planning stage as a solution.

2. p 10. Ariane 4: Lengthened tanks in stage 1

3. p 10. Ariane 1: Spacenet 1, the first American satellite in the top category with respect to payload capacity

4. p 10. Ariane 3: Equipped with two solid-fuel boosters

5. p 10. Ariane 4: Horizontal integration of liquid boosters at MBB

6. p 11. Ariane's Launching Area: In Kourou, French Guyana, the second installation is almost complete

7. p 11. Ariane 5: Dream of the future, but this version is favored in France

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AEROSPACE

ESA ORGANIZING NEW AEROSPACE PROGRAMS

Frankfurt/Main FRANKFURTER ALLGEMEINE ZEITUNG in German 22 Dec 84 p 5

[Article by Guenter Paul: "Too Late for Ariane 5?"]

[Text] The amount of involvement of the FRG in the development of the technically demanding propulsion unit for the European space rocket Ariane 5 will be far smaller than the government wanted. Originally those in Bonn had been thinking about undertaking 30 percent of the project. But meanwhile the program has gotten under way without Germany having subscribed to shares, because the Federal Cabinet was not yet able to make any decision on this. Now a participation of only 22 percent is being discussed.

In June, the Council of the European Space Agency ESA had unanimously decided to have as official programs of the ESA the European contribution to the American space station Columbus, the space rocket Ariane 5, and its propulsion unit HM60. First of all a 2-year preparatory program for Columbus and HM60 was to be initiated. Those member states of ESA which did not want to take part in the program were to declare this by the date of 31 October. On 1 November the announcement on participating in HM60 and shortly after than in Columbus was produced for inspection.

Back on 1 November the French subscribed to 53 percent participation in HM60. Belgium and Sweden followed with 5 percent each, and finally Italy with 15 percent. With that, the condition for an initiating of the program--the securing of at least 70 percent of the funds--was fulfilled. A few days ago, the work was begun. If no other interested parties were to be found later, France, Belgium, Sweden, and Italy would have to raise all the funds for the development of the HM60. But this is unlikely, especially since at the request of Spain the subscription deadline was extended to 10 February of the coming year. After this date, joining the agreement is possible only if all participants approve of this.

The FRG had been hoping, among other things, for a contract to build the turbopump which conveys the liquid oxygen into the propulsion unit, as one of the propellant components. The firm of MAN [Augsburg-Nuernberg Machine Factory, Inc] was expected to the the primary contractor. But meanwhile the French have indicated that now Italy will undertake the development of this pump. In their opinion, above all the Germans should make available

the test blocks in Lampoldshausen for the propulsion-unit tests. But this contribution to the development and testing of HM60 is not particularly attractive. Of the technically interesting components, only the engine chamber is likely to be left for the FRG. The engine chamber development at Messerschmitt-Boelkow-Blohm is so significant that the ESA will not be able to get along without this.

Up to now no member state of ESA has yet subscribed to the Columbus program. It is being said that the other European countries are waiting for the FRG to make the first move, because in this project Germany is supposed to take the lead. A report circulated a few days ago, that the cabinet decision on this is not to be made for the time being because the United States is considering a postponement of its program on the manned space station, has meanwhile been denied. Beggs, the head of the American space agency NASA, is supposed to have said on this subject that aside from a minor redistribution of funds, the work will go on as planned also in the next few years. It is being said in Bonn that the story about the supposed delays has been deliberately circulated as a rumor by opponents of the Columbus program.

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AEROSPACE

BRIEFS

FOKKER'S PARTICIPATION IN ERS-1 SATELLITE--Aircraft manufacturer Fokker will participate in the development and the construction of the European ERS-1 satellite. This satellite will be brought in an orbit around the earth in 1989 by order of the ESA [European Space Agency]. Fokker will receive a share of 5 percent in it as subcontractor to the prime contractor Dornier of Germany, also an aircraft manufacturer. Fokker announced that 40 million Dutch guilders are involved in this order. The ERS-1 satellite will be equipped with radar and special measuring instruments to investigate processes in the sea. This information is important for a better understanding of climate developments. The new satellite will furnish data on ocean conditions, ice formation, water pollution and the weather. This is especially important for the offshore [petroleum], shipping and the fishing industries. Fokker will be responsible for the construction, installation and testing of the satellite's cargo bay. The construction of the testing instruments and the software development are included. Fokker will also design the heating of the cargo bay and the antennas. The satellite will weigh 2200 kg and will be 11.8 m tall and 11.7 m wide (sun panels unfolded). [Text] [Rotterdam NRC HANDELSBLAD in Dutch 4 Jan 85 p 11] 12433

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CIVIL AVIATION

ITALIAN AIRCRAFT INDUSTRY REORGANIZES TO BE MORE COMPETITIVE

Stuttgart FLUG REVUE in German Nov 84 pp 8-14

[Article by Klaus Mueller: "Concentrated Thrust"]

[Excerpts] "They are brilliant designers. We are glad that we can profit from their ideas" was the way German conversational partners described the Italian share of the tri-national cooperation on the Tornado aircraft. And they have a good reputation worldwide as partners, not only in Europe: Italy's aeronautical and aerospace engineers are involved in work on Boeing aircraft, are partners of American and British helicopter firms, are developing the AMX ground attack aircraft jointly with Brazilian colleagues, participate in manned and unmanned space projects, and--if plans materialize--will infuse their ideas into the European fighter 90 (EFA--European Fighter Aircraft).

Complementing this are successes in the production and above all export of their own models. Helicopters and executive aircraft of Italian origin, equipment and space systems, trainers and electronics have driven their export share up to a proud 60 percent, and in some firms it constitutes even more than 80 percent of sales. Sales at home, the president of the Italian Industrial Society AIA (Associazione Industrie Aerospaziali Italiane), Dr Raffaello Teti, makes clear during a conversation, leave something to be desired. Missing to date are a clear policy of the government in Rome, systematic procurement programs of the armed forces, the concerted support and project control by the government. These measures and the merging of industrial capacities now being strived for could lead to a cost reduction and thus improved prospects on the world market.

Strength Through Concentration of Capacities

In the future, the government is to--and industry will--accelerate the programs with a concentration of effort. In the space and electronics are, the reorganization has already been completed: Since April the state-controlled Selenia Spazio has been consolidating the activities of several firms which have enjoyed very definite success in this field, and has been combining the capacities for both space and ground equipment. Thus, to give just one example, the firm is responsible for the payload of the Olympus experimental satellite, which is being built for ESA, and at the same time is developing the antennas for the group and individual reception from this directly transmitting satellite. By the end of the year, more than 900 persons will be employed in the space sector alone, with yearly sales around 100 billion lire (DM62.5 million), and rising, if anything.

In any event, the managers are not worried about the future. They are the main contractor for Italsat, are involved in work on the payload of the Intelsat VI, and are hoping for participation in work on the space station, where new capabilities would be acquired. Selenia Spazio is ready to participate, wants to inject its experiences in the fields of telecommunications, computer science, data transmission, telemetry and robotics, and is also vying for the docking radars for the orbital transport systems. In the process, the enterprise is hoping to gain future-oriented knowledge in the area of telecommunications using laser or microwaves. To be sure, and this the firm's management terms a prerequisite, the Italian participation in the space station would have to be additionally financed by the government, above and beyond the national program, which among others includes the Italsat and Iris satellites as well as scientific earth satellites. "Space travel is achieving commercial status, and we are involved," thus the formulation being given, and not without pride, in the executive suites on the outskirts of Rome.

Warning Signs at Aeritalia and Agusta

Less optimistic is the current situation of the airframe companies which have grouped together in the two large blocks of Aeritalia and Agusta. It is to them, primarily, that the warning signs apply: the employment figures in the industry overall dropped somewhat, as did the rate of increase in sales, with only the exports--valued at 2,300 billion lire (DM1.45 billion DM)--holding their own. Agusta, for example, according to the firm's director Teti, had to take a loss of $120 million last year and release personnel. Teti conceded that, only in around 4 years, once the structural measures have taken effect and the enw projects such as the A 129 and EH 101 have become established, can a healthy balance be expected. In any event, for 1984 he is figuring on sales of 863 billion Lire (about DM 540 million), and 12,000 employees.

In the helicopter area alone, firm orders for 200 billion lire (DM125 million) fill the order books. But the blanket of capital has grown thin as a result of losses sustained in past years. Foreign money was taken in, especially as dollars, and in view of the rising exchange rate the firm is experiencing difficulties in making the interest payments. In any case, the Agusta family's share has dropped to less than 10 percent, and the principal shareholder is the state holding company Efim.

At first involved mainly with helicopters, Agusta has in the meantime also turned to winged aircraft; helicopter production claims only about 65 percent of the firm's capacity. In any case, following successful cooperation with American firms on a license basis, the firm has gained enough know-how to develop the A 109 and A 129 as promising models of its own. In the A 129 Mongoose, the Italians see the first European second-generation combat helicopter, and, despite the firmly agreed to German-French cooperation on a similar project, they are hoping for German interest in the program. At any rate, according to Dr Teti in a conversation with FLUG REVUE, the Mongoose will enter the construction phase in 1986 already (the Italian armed forces have ordered 200 of them), and the PAH 2 in 1991 at the earliest. He

considers a cooperative venture with French and German industry possible, also on future projects such as the LHX, for the purpose of becoming independent of the U.S.A. in this field as well. Agusta participates in the form of studies in the NATO project TTH (Tactical Transport Helicopter).

In exports, Agusta has had success with the SF 216 basic trainer, of which 900 have been sold in the piston or turboprop versions. The light jet trainer S 211 and the bush aircraft Canguro round out the products of Agusta, 85 to 90 percent of which are exported. The military portion of the production is currently around 80 percent, but Dr Teti hopes to increase business with the civil sector in the future, among other things with the naval helicopter EH 101, designed jointly with Westland, which in addition to military operations is supposed to be excellently suited to civilian offshore flights, and is to make its first flight in 1986.

Only slightly larger, with sales of 867 billion lire (DM542 million) and 13,300 employees, is the Italian state-controlled Aeritalia. Its products and projects--with the exception of helicopter production--cover the entire spectrum of aeronautics and space technology, ranging from transport aircraft to satellite structures, from drones to modern combat aircraft, from commuter aircraft to cooperation in large commercial jet programs. The economic development of this state-controlled enterprise was more placid than at Agusta, but Aeritalia too had to put up with declining growth rates.

The backbone of the production, until circa 1988, is the trinational combat aircraft Tornado, which is being built jointly with the British and Germans. Taking on increased importance in the military sector is the AMX project, developed jointly with the Brazilians and Aermacchi, which is to replace the Fiat G 91 and G 91Y. Nearly Circa 260 aircraft have been ordered, and both partners are hoping for exports as well. Still being produced is the G 222 transport, 44 of which are being flown by the Italian Air Force and which was likewise sold abroad. Especially South American customers are showing an interest in this robust aircraft.

The most important program is the turboprop commuter aircraft ATR 42, jointly conducted with the French firm Aerospatiale, which took off on its first flight in August. This aircraft, designed for 42 to 49 passengers, is to be delivered from next year on and could find a good market in the expanding regional air transport of the Old and the New World. The first orders, at any rate, have been received. A cargo version and a stretch version are to be developed, provided marketing prospects materialize.

Specializing entirely in accessories, but doing this very successfully, is Microtecnica in Turin. Not without pride, Giorgio Lapidari, vice president and manager of the enterprise, enumerates the projects on which this rather small firm, with its 1000 employees, is working: Several systems of the AMX; hydromechanical and electronic equipment for the British experimental aircraft EPA, the test findings of which are to be used for the European fighter aircraft 90; thermal control systems for space flight--in short, Microtecnica is involved in many essential aeronautical and space flight programs. One hundred fifty men, 15 percent of the labor force, are working

on development. Only about 10 to 12 percent of all orders are received directly from the Italian government, all others are received from the principal contracting firms, which like to keep the clever outfitters in Turin in mind.

And via United Technologies and Hamilton Standard, which hold shares in the enterprise, the chances are good that NASA too will discover the road that leads to Turin.

PHOTO CAPTIONS

1. (p 9) With equipment systems such as this hydraulic pump, Microtecnica has gained a strong position on the world market.

2. (p 9) The Italians are sought after as partners in the Intelsat (top) and ground attack aircraft AMX (large photo). The combat helicopter A 129 Mongoose (right) has been ordered by the Italian armed forces, but Bonn has given it the cold shoulder.

3. (p 10) Sound foundation: several high-performance versions are derived from Partenavia's P 68C, such as the turboprop 7-seater P 68CTC and the Observer. A naval version is being developed.

4. (p 11) Future projects: The light jet trainer S 211 is looking for buyers (top). For the AMX (below), Microtecnica is building a number of systems such as this actuator (right). Together with France, Italian industry has developed and built the commuter aircraft ATR 42 (left), which recently also completed its first flight successfully in Toulouse.

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COMPUTERS

ITALCAD TO PROVIDE FIFTH-GENERATION COMPUTER TECHNOLOGY

Turin ATA-INGEGNERIA AUTOMOTORISTICA in Italian Aug-Sep 84 p 505

[Text] On the first of March last year, an agreement between Selenia--of the IRI-STET group--and the American company Auto-Trol created ITALCAS, a company whose objective is the development and sale on the European market of electronic forecasting support systems based on their CAD computer. The agreement established a stock company with Selenia owning 51 percent of the shares and Auto-Trol the remaining 49 percent.

ITALCAD, which is a part of the Selenia ELSAG grouping, has its headquarters in Genoa and has acquired the control and coordination of the European partner Auto-Trol, which will keep its commercial name and functions. The creation of ITALCAD is a response to the need to create a company in Europe with the capability of combining knowledge of the European market and its needs with experience acquired in the United States. Recent years have demonstrated the limited application of American products to the technical culture and the operative needs of a diverse European reality and, at the same time, the impossibility to achieve goals without U.S. technical experience.

The creation of ITALCAD is designed, through access to lead technology, to obtain state-of-the-art products adapted to European users. Auto-Trol technology will facilitate attainment of this objective, as the products developed by the Denver industrial firm will possess characteristics of "adaptability" thanks to hardware and software designed to permit maximum flexibility for the user.

ITALCAD structure comprises a general management with offices in Genoa, the function of which principally concerns the technical and managerial coordination of the European associate, organized as an independant company, and assigned the task of personalizing products based on local needs: linguistic, normative, operative specificity.

Each associate will possess, consequently, all the necessary resources to develop marketing and sales, applied personalization, support activities and hardware and software maintenance, and customer training.

Research and development resources will be concentrated in Genoa in order to further add to American knowhow through the manufacture of their own products.

Auto-Trol Technology Corporation was founded in 1962 in Denver where its general management is located. Since 1972 it has provided computer-assisted forecasting systems for manufacturing applications. Auto-Trol has made considerable research and development efforts in order to develop products capable of utilizing the potentialities of fifth generation computers.

Auto-Trol systems are obtained through work terminals linked to a central computer or in independant configurations, provided locally with the relevant data-processing network linkage resources.

Since 1983 Auto-Trol has achieved sales of $54 million, with a market share of 5 percent and an increase of 23 percent over 1982 sales.

Auto-Trol has been in Italy since 1979 and has supplied a distinguished clinetele: FIAT, IVECO, Italimpianti, ENEA, ENEL, Technomare, Ansaldo.

Every year Auto-Trol invests 18 percent of its turnover in research and development and employs some 600 persons in this activity (12 pm, 1984, 04, 04).

12425
CSO: 3698/170

COMPUTERS

FRANCE'S ONERA WORKS ON SUPERCOMPUTER ARCHITECTURE

Paris INDUSTRIES & TECHNIQUES in French 10 Nov 84 p 104

[Article by Franck Barnu: "Data Processing in the Future and Now"]

[Text] DERI is the Department of Computer Design and Research of the Design and Research Center (CERT) of the National Aerospace Design and Research Office (ONERA) at Toulouse. It unites some 50 people around five major topics: basic software design and production, design of new computer structures, digital analysis, software development and software engineering. Therefore, it harmoniously blends pure research work and applications orientation.

CADMIP (Computer-aided design multiple integer programming), an entirely original initiative of CERT, is an indication of the interest shown in applied data processing. The data processing design group formed around CERT relies on Aerospatiale, the Midi-Pyrenees region and the National Agency for Development of Automated Production, besides ONERA. Its mission is CAD, with special emphasis on promotion, advice to companies and teaching. "Basically," Serge Ourties of CADMIP said, "it is an idea of the CERT data processing department. We wanted to create an intermediate organization between research and industry. To be credible we began by working on a concrete case: writing CAD software for development of prestressed concrete floors meeting the needs of a Toulouse company.

'Capri' CAD arose from it. It was a success since today this product is used to the greatest satisfaction of the manufacturer." With the final examination passed, CADMIP saw the light of day in April 1984. "Although we can write software, application development is not our prime objective," Serge Ourties declared. "Our mission is to provide advice, to help a manufacturer select CAD software, to adapt it to his own needs if necessary. We will develop a program only in the last resort." When you understand the complexity of CAD software and the "dynamism" of "sales support" you cannot help but praise this initiative.

Tool for Validation of 10 MFlops

On the research side, the work done since 1973 on supercomputer architecture has put France in the lead in research on multiple instruction multiple data stream (MIMD) architecture. This may not make up for the lag in supercomputers, but it will be noted that the team is responsible for installing the basic tools for constructing the famous French scientific computer. A first important milestone will soon be passed with the installation of a system at ONERA: the task and software synchronization language developed at CERT (compiler, architecture simulator) will be installed on a SEL 32/77 which will make four vectorial processors AP 120 B of the Floating Point System work in parallel. The power (real, not theoretical) expected for this validation tool is between 8 and 10 Mflops (one single AP is at 4 Mflops). The aim: "Since the technology is not available, taking in the problem by a parallel treatment performed on standard products is a good cheap way to achieve capacities," Christian Fraboul explained.

The team that Robert Demolombe belongs to has a long lead. While second generation data bases (relational data bases) have really been on the market only 2 years, it is working on a definition of a third generation data base. "Because a whole new field of applications, CAD, robotics, expert systems... requires characteristics that are not met by relational DB's." Five great orientations have been taken: offering of easy communication languages with the DB (natural or graphic language), defining a DB able, by reasoning, to deduce new data from the date it contains, offering the possibility of handling incomplete data, storage of structure data and, finally, storage of texts and images.

12724
CSO: 3698/208

FACTORY AUTOMATION

BRIEFS

FINLAND'S VALMET STARTS CAM PRODUCTION--Valmet Oy is going into factory automation. The corporation's communications equipment group has established a new unit, Valmet Oy Fa Software, which will commence developing computer controls, or so-called CAM products. The new unit will concentrate on the planning and production of factory and single item controls. Ilkka Lilja has been named head of the new unit. The business will operate in Jyvaskyla and Tampere. [Text] [Helsinki HELSINGIN SANOMAT in Finnish 24 Jan 85 p 27]

CSO: 3698/231

MICROELECTRONICS

COMMENTARY ON SPIN-OFF FIRMS IN FRG INDUSTRY

Hamburg DIE ZEIT in German 30 Nov 84 p 38

[Article by Hans-Otto Eglau: "Invitation to Take Risks - Siemens Encourages Staff Members to Be Independent"]

[Text] Burkhard Berghoff, age 36, married with five children, group representative in Central Sales Abroad (ZVA) at the Munich Siemens headquarters, had an unexpected call from within the company: Would he like to be his own boss as an independent businessman?

A partner for the road towards a new future was already there: Hans-Peter Feuerbaum, 35, an engineer with a Ph.D. in the Perlach Research and Development Center of the company. With an electric measuring device for semiconductor circuits developed by Feuerbaum over several years, the multi-national electronics firm is testing at this time a potentially pacesetting pilot project: The "discharge" of ambitious staff members into enterprising independence.

For Feuerbaum this had been the only way in which to turn his invention into a marketing success because the Siemens managers, who are covering with about 250,000 different products from the microchip to a nuclear power plant, the broadest supply spectrum among all electronics manufacturers, had rejected acceptance of a device into their program which could be of interest only to a very limited number of users.

Feuerbaum's partner Berghoff did not need much time to think either. The impatient young manager who had demonstrated his talents with the private development and marketing of a new type of corkscrew with a patent pending knew that his promotion to the next step on the Siemens pyramid, that of a department head, was four or five years off.

A Worthwhile Try

Only two years earlier, the technology developed in the Siemens labs would have landed unceremoniously in a dead filing cabinet, but just at the moment at which the pertinent energy technology department (UBE) had turned down production of the newly developed device, a team under the chairmanship of General Manager Jochen Mackenrodt though of ways in which unused technical know-how could be applied meaningfully outside company confines.

The attempt seemed promising for two reasons: on the one hand, Siemens managers, as the "founding fathers" of risk-taking company starters would retain access to a further-developed technology, possibly even as consumers. On the other hand, this would provide a new approach to the solution of one of the major problems in the German industry: the disinclination of talented scientists, engineers and managers to pursue a product or marketing idea with a future on their own. "You often have to carry the horse to the water", is how Helmut Rausch, until 1982 member of the board of the computer manufacturer Nixdorf, and since then, using his own participation capital, promoter of young entrepreneurs, characterizes the situation.

The shortage of risktaking "bail outs" explains in part the reticence about which one hears complaints in a number of sectors of advanced peak technologies since, similar to earlier innovation thrusts, the present advance into micro-electronics is also connected with the names of a number of pioneers - from the transistor inventor William Shockley to the founders of the "Silicon Valley" company Intel, which, one year after its formation, produced the microprocessor, to the rise of Apple Computer from a garage industry.

Jubilee celebrations, company loyalty rewarded civil-service style, and a more and more perfect social security, on the other hand, make it seem advisable in the Federal Republic, even for dynamic individuals, to make their careers in the service of others. As the WALL STREET JOURNAL comments with some sacrcasm: "It is the German way to spend one's whole life in a large company and then to retire with a generous pension".

To this must be added the fact that the ability to build up a company on one's own and to become rich this way has met with only limited social acceptance in the Federal Republic. Quite the contrary: as soon as they become successful, risk takers bring down social envy on their heads and, if they fail, often meet with undisguised gloating. This is why the fear of falling into a bottomless pit through failure keeps many from giving in to the lure of forging their own existence. "The risk of not succeeding is not any greater here than elsewhere, but the consequences are so much more serious", this in the judgment of Volker Dolch who went independent eight years ago with the manufacture of a new type of measuring device for testing microcomputers. In his words: "I know entreprenuers in the United States who only hire individuals who have tried once or twice to start something on their own."

How permanent cell division of young dynamic companies can make an entire region into breeding grounds for a new basic technology can be seen by the example of the electronics industry in the Southern California Silicon Valley. Fairchild Camera and Instruments Corporation alone formed a starting base for 53 new establishments, among them such wellknown companies as Intel, National Semiconductor and Advanced Micro Devices.

Many of these company "spin-offs" (in best American business jargon) already have offspring of their own. In most cases, the founders were between 30 and 40 years of age, some of them were still in their twenties. "In large-scale

companies, people of this age group are in most cases still on the middle rungs of the pyramid, as specialists without well-rounded experience and market knowledge", states Robert Noyce, at age 40 the founder of Intel, to explain the relatively small number of "spinn-offs" in the giant firm sector.

At Siemens, for example, only the six managers of the company divisions have an overall responsibility encompassing all operations. The regional manager, only one step below, has a responsibility limited to production, sales or development. As the former Siemens manager and present company consultant Alfred Prommer emphasizes in evaluating the weakness of the giants as a starting base for new companies, "even IBM does not train its staff to become independent entrepreneurs". The venture capitalist who helped to found the firm, Peter Rosenbeck, also a Munich resident, states it even more brutally: "No creative chaos can develop here, people are disciplined and frustrated early on".

On the other hand, the emphatically market-oriented computer ascendant Nixdorf came up with far more company starters than, for example, Siemens or IBM - in the opinion of ex-chairman Rausch, between 50 and 60 to date, among them several former development chiefs of the company. However, no second Nixdorf has arisen to date from their circle.

For a long time, the risk capital required for the establishment of large companies on the basis of rapidly developing future technologies just was not there. Thus, Volker Dolch had to subordinate his initial parent company in the Hessian Dietzenbach to its subsidiary Dolch Logic Instruments, Inc., in San Jose two years ago, in order to have easier access thereby to American capital sources. At German banks, the young entrepreneur had met with considerable interest in valuable securities, but little knowledge of electronics. States Dolch: "How can anybody judge the value of our company if he doesn't understand our knowhow?"

Mushrooming

With a company-capital injection of the California venture capital company Churchill International the 40-year-old logic chief succeeded in establishing himself in fourth place worldwide in his special market with a work force of almost 230 and a turnover of probably 23 million dollars - directly behind the American electronics giants Hewlett-Packard and Tectronix, and as a subsidiary of the American conglomerate, Gould.

Even though recently venture capital funds have been mushrooming in the Federal Republic as well, promoters such as investment broker Rosenbeck continue to see financing as the main problem, especially with large projects. "It costs DM 15 million to develop a robot up to the building of the prototype." The recipe of starting with a trickle rather than a stream no longer works. "With rapidly advancing technologies you have a two or three year lead, during which time you must establish a position in the market. You can't start small," according to Rosenbeck.

In addition to the risk capital cover which is too small, it is especially the lack of operational knowledge and market experience of many starters which stands in the way of having "spin-offs" succeed. Thus, the major problem for the two former Siemens workers John P. Gibson, 35, and Addy Guenther, 30, who went independent two years ago with a garage industry for energy-saving [disk?] drives, was establishing contact with potential customers. "We just rang doorbells and introduced ourselves" is how Guenther frankly describes the beginnings of his company which, this year, has "a turnover target of one million".

The Price of Success

As for the two development engineers Gibson and Guenther, the business management of his young company was also the vital point for Rolf Wagner from the Black Forest. The erstwhile development chief of the Kienzle-Apparatebau computer company, who tests in his Village facility microelectronic components for machines and air conditioning facilities, admits frankly today that he would never start again without a businessman as partner. Wagner says: "I only managed funds before and never had to worry that some would come in". Meanwhile, Wagner is over the worst with his Technolab company and has reached a 3.5 million turnover in his third year with 30 workers. The price: He has practically not had any vacation since he started. As he says: "In the first three to five years one must devote all time, including weekends, to the new company."

As in the massive use of venture capital, the Americans are also years ahead of us in the management of "spin-offs". There, many founders have already sold shares of their fledglings and have been investing themselves meanwhile in promising new companies, providing their beneficiaries at the same time with tips on business management. In the estimate of the former Nixdorf manager Rausch, "we are now about where the Americans were in 1968".

With the active assistance of the "parent company" the two former Siemens employees can count on the "softest landing" possible in their independence. Their own technical developments, in whose commercial utilization no company division is interested, which, on the other hand, had been classified by a small team of experts as interesting, pass through the critical starting phase, as a rule up to making prototypes, still on the safe Siemens foundation. For example, in the fall of last year the new company "ICT Integrated Circuit Testing" (with a starting capital of DM 500,000) was founded only after presentation of the completed starting model of the Feuerbaum invention at the Munich "Electronica".

The subsequent merger with the Techno-Venture Management company (TVM) established two years ago with a minimum participation of 49 percent then turned out to be surprisingly difficult: even though Siemens itself participates in the venture company at 25 percent, the latter's management twice shattered the foundation budget for lack of sufficient business management ability. Only when the Siemens managers presented in Burkhard Berghoff a business man as an additional founder did the other venture capitalists agree.

In an office tract furnished with old Siemens furniture in the Munich suburb of Ottobrunn, the two career transfers have been practicing for several months their new roles as entrepreneurs. The work load, twelve hours a day, including weekends, according to Berghoff, "exceeded our worst expectations". A biting note: The more the two model pioneers slave, the smaller their chance of finally breaking the umbilical cord from their former employer becomes, i.e., if they succeed, Siemens has reserved a 25 percent participation in the new company - at a zero rate or, more accurately, as a repayment of the preliminary assistance provided in the starting phase.

9243
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MICROELECTRONICS

SIEMANS, PHILIPS HOPE TO COMBAT JAPAN WITH MEGACHIPS

Bonn DIE WELT in German 5 Nov 84 p 3

> [Excerpt] Siemens hopes to successfully put an end to the catch-up game with U.S. and Japanese competition in the electronics sector with its megabit chips. The goal should be reached in 1 1/2 years.

The basic investment for this was made by Siemens in Munich-Neuperlach, where a think tank for 7,000 sceintists and engineers was set up on 350,000 square meters, dubbed "Datasibirsk" by the staff. At the outer edges of the territory, we find an unpretentious hall, noticed only because of a blue structure inverted over a flat roof: the pilot plant, in which 100 scientists are puttering on the future super chip.

They are working under unreal conditions. Their product is so fine that the physical bounds are soon reached. The structure paths of the innumerable and invisible transistors are applied by photo technique to silicone plates in 12 to 15 layers, the threads being more than 60 times finer than fine woman's hair. The slightest vibration here can slightly shift one plane against the other and invalidate a chip production; all that is needed for this to happen is, for example, a streetcar conductor outside stepping too hard on the brake.

Chip builders therefore avoid rocky ground which conducts vibrations very well; they prefer absorbing gravel soil, as it is found below Munich, and as it also can be found in Regensburg, where Siemens is setting up at this time a 330 million chip factory for the megabit series. The foundations for two additional mega halls are being poured in Munich next to the old pilot plant.

In addition to vibrations, dust is the greatest enemy of microelectronics workers, since a harmless dust grain affects the fine conductor lines like a rock on a railroad track. There are a good 50 million dust particles whirling around in each cubic meter of Munich city air, but in the halls of future mega production there must be not more than ten (!). By comparison, according to mega-chief Friedrich, the air of an operating room is outright polluted.

The German electronics giant will invest a fat 1.4 billion mark in the chips race and - so as to prevail against Japan and the US - exchange know-how with

the Netherland's Philips as the only other European who can compete.

However, a second deadline is still there: by 1989, the 4-megabit store will be on the market. Its circuits now are as thin as 0.7 micrometers. And this will continue, so that after a few more years the end could lie at 100 megabits; this is a factor of 100 compared to the first megachip which is as yet not ready for manufacture. According to Friedrich, "this is when we will have reached the physical boundary". Then, a human hair will be 600 times thicker than every single one of the hundreds of thousands of conductor paths on the thumbnail-sized platelet.

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MICROELECTRONICS

BRIEFS

BULL REDUCES MANPOWER--Bull management presented a "plan of economic and social adjustment" providing for the elimination of 700 jobs between now and the end of 1985 to the plant central council on 30 October 1984. Right now it is only a recommendation made within the context of legal proceedings. A decision on these provisions is expected by mid-November. Actually 930 jobs would be eliminated but at the same time 230 vacancies would open up in high-skill areas. If this procedure is carried out, the number of CII-Honeywell Bull employees (other companies of the group are not affected) would go from the present 18,100 to 17,400. These job eliminations would take in natural departures, early retirements and internal and external reclassifications. Bull management explained "like all its competitors, Bull must cut part of its operating costs to be able to continue a strong growth and a massive investment effort which are essential to the durability of the group." [Text] [Paris ELECTRONIQUE ACTUALITES in French 2 Nov 84 p 6] 12724

CSO: 3698/208

SCIENTIFIC AND INDUSTRIAL POLICY

GOVERNMENT AID FOR MICROELECTRONICS DEVELOPMENT IN AUSTRIA

Vienna ELEKTRONIK-REPORT in German Oct 84 p 11

[Article by University Lecturer Dr Heinz Fischer, Federal Minister for Science and Research: "Assistance to Microelectronics Developments in Austria"]

[Text] For the people in a small country which is poor in raw materials, it is important to realize that a lasting safeguarding of their standard of living and their jobs is not necessarily guaranteed in the absence of a mastery of microelectronics technology. Microelectronics occupies a key position in the science-intensive industrial-commercial value creation our country needs, and in this area Austria should make use of its good level of education and the circumstance that in the sphere of microelectronics, economic bigness and financial power are not necessarily a prerequisite for success.

The Federal Ministry for Science and Research (BMfWF) became interested very early on about developments in the sector of microelectronics and, taking as a basis the "Microelectronics Study" of the Austrian Academy of Sciences and the Institute for Economic Research, it incorporated in the research planning for the 1980's a key section--"Microelectronics and Information Processing"--and also publicized this as a component of policy. In 1983, the BMfWF spent about 28 million Austrian schillings for relevant projects from funds earmarked for job studies. And also other promotional institutions--as representative of which I will mention here the research assistance fund for the commercial sector--have been increasingly assisting industrial-commercial product developments in connection with which the use of microelectronics was a key element of operation.

In 1984 the Federal Government decided on additional assistance measures, which are codified in the "Assistance Program for 1984 to 1987 for the Central Technological Field of Microelectronics." This microelectronics assistance program provides measures for further strengthening the relevant research capability and also a targeted assistance for applications of microelectronics and information processing which are in keeping with the latest state of the art in each case.

This assistance campaign is beginning in January 1985, with the initial contact agency for applications for assistance being the BMfWF. Those

entitled to apply are Austrian enterprises which carry on a predominant portion of their research, development, and production within the country.

Preferential treatment is being given to project proposals in which the cooperation of the applicant with a point-of-main effort institute or some other relevant Austrian research institute has been explicitly demonstrated, and in which corresponding sociologically sound accompanying measures are planned, in conjunction with the participation of employee representatives, for the introduction of new technologies on an operational level (for example, the use of industrial robots, office automation).

Here the 12 focal points are: Semiconductor technology inclusive of applications, sensors, microprocessor engineering, communications technology inclusive of terminal units, process control, computer graphics and digital image processing, artificial intelligence, advanced robotics, flexible automation inclusive of CAD/CAM [computer-assisted design/computer-assisted manufacturing], metrology and measuring-data processing.

Quality and reliability, technology consequences assessment (the last two focal points have an integrative effect on all the other 10 technology emphases and therefore are to be viewed more as cross-field sectors than as technology sectors in the narrower sense).

In addition to the funds for assistance to research provided in the budget of the BMfWF from 1985 on, in cases of need in connection with existing relevant capital-expenditure projects (especially for creations of firms,. diversifications, product improvements, and production conversions), the Federal Ministry for Transport (economic coordination) will be granting special subsidies (irrecoverable grants and loans) whose total volume is limited to a maximum of 250 million Austrian schillings per year. In order to be able to give these funds especially to small and intermediate enterprises also, these grants are limited to a maximum of at most 10 million Austrian schillings per firm and year.

I believe that with this assistance program we have already made substantial advances in Austria in taking advantage in our economic policy of the opportunities which microelectronics offers to the people in our country. But in order to make use of the positive possibilities of microelectronics while averting its negative effects, also attendant sociological research work, acceptance analyses, participative strategies for product and process introductions, and corresponding humanization programs are necessary, so that the new technologies are not used as mere instruments of rationalization without the role of the person in the working process being taken into account.

12114
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SCIENTIFIC AND INDUSTRIAL POLICY

REPORT ASSESSES FRG R&D COMPETITIVENESS

Duesseldorf HANDELSBLATT in German 20 Dec 84 p 4

[Text] Because of a definite research push in recent years, the standard of performance of German industry can also hold its own in international competition with respect to high-technology goods. The "new dynamics" which has arisen because of this is helping to overcome the "deficiency in linkage" between the existing research capability and the application of new technologies.

This is the conclusion arrived at in a study done by the Institute of the German Economy (IW) on the prospects which are presenting themselves for the German economy through research and development. Antje Pieper, the author of this study, which was published by the German Institute Publishing House GmbH, calls upon science, industry, and the State to concentrate their forces to achieve optimal accomplishments.

In 1983, industry was the largest financier of research and development in the FRG, with DM 26.3 billion (56 percent) out of total R&E expenditures of DM 46.8 billion. DM 31.6 billion or 68 percent of the FRG's R&D budget--inclusive of governmental grants of DM 5.7 billion--were spent in the research laboratories of the enterprises.

With that, the FRG is surpassed only slightly by the United States. There, the share held by industry in total expenditures for research and development comes to 70 percent, whereas in Japan it is only 61 percent.

In 1981, $257 were spent per capita in the FRG for research and development. Thus the FRG was even ahead of Japan ($230), and internationally it was surpassed only by the United States ($322).

The largest percentage (about 87 percent) of the R&D funds from industry was raised by three industrial branches: Topping the list at 35 percent was the steel-construction, machine-building, and automotive industry (including electronic data processing).

In all, in 1981 about 372,548 researchers/technicians/managers worked in research and development in the FRG. Two thirds of these (242,544) were employed in industry, a fifth (73,134) in the colleges, 15 percent (53,370) at the Max Planck or Fraunhofer Institutes or major research or other

research institutions, and 2,500 were employed in private scientific institutions. About three fourths of the total research and development in 1981 was financed by large firms with more than 2,000 employees. In the FRG at present, a north/south gap exists only in connection with the subject-matter of the research, but not in terms of the R&G capacities or in the streams of financing. The southern Federal Laender invested early on in promising, high-technology fields of research and availed themselves of information technologies above all. In the opinion of the author, excellent R&D capacities for long-range future technologies such as aeronautics and astronautics, nuclear engineering, and sea and soil research will bring the new era to the north probably in the 1990's--assuming corresponding infrastructure improvements.

The author draws from her study the conclusion that the FRG is doing good and efficient research work in the colleges and in industry, and above all outstanding basic research, which in Japan, for example, is more meagerly provided for. She says that the deficiency in the FRG lies in the conversion of the R&D results into processes and products, in inter-penetration. Researchers in all sectors are called upon to further develop their research products into marketable products.

Also the technological shortfall in the manufacturing of integrated circuits is being offset increasingly by applications of microelectronics in many sectors, above all those of machinery-building and the automotive industry, not to mention software development. Even in biotechnology, the Germans have given up their torpor and have been dogging the heels of the Americans, who have been moving forward rapidly.

On this subject, the author calls for the European card to be drawn. It cannot do for each European state to pursue nationalistically its own small technology development instead of taking advantage of the overall European market with its 330 million people (including Spain and Portugal) by way of a division of labor. The success of European space research, which is now giving serious competition to the American NASA with the launch vehicle Ariane and the space laboratory Spacelab, is only one example. The joint development of the large-capacity Airbus and the European nuclear fusion facility in England as well as the new European program Espirit for assisting information technologies have also shown that the future lies in the European challenge. She says that the European states must band together into a research and innovation orchestra.

International cooperation and a division of labor in all forms and on all levels, from communities, countries, and businesses to researchers and universities, is essential, she says. Instead of remaining in a "European fortress mentality," research and development should also avail themselves of the world markets. Mrs Pieper mentions as European prerequisites for this, among other things, the removal of research protectionism and excessive red tape, the elimination of the trade barriers on new technologies at home, the formation of a homogeneous European communication market, and the removal of the national postal monopolies and support for an international flow of technical information for science, technology, and industry.

Table: The Research Push--Expenditures for Research and Development (R&D) in the FRG



Key:
1. 1983 in millions of DM
2. Average annual increase from 1973 to 1983 in percent
3. Total
4. Including
5. Federal Government and Laender
6. Industry
7. The R&D ranking list
8. Level of R&D expenditures in 1981 in millions of DM
9. Average annual increase in 1981
10. Average rate of increase in R&D expenditures, 1973-1981. in %
11. R&G expenditures: Share in total turnover in % (1973-1981)
12. Electrical engineering, precision mechanics, optics
13. Steel-construction, machine-building, automotive industry, automatic data processing
14. Chemical industry, mineral oil
15. Plastics, rubber
16. Non-metallic minerals, ceramics, glass
17. Energy supply, water supply, mining
18. Leather, textiles, clothing trade
19. Wood, paper, printing trade
20. Iron, nonferrous metals

[key continued on next page]

21. Essential and nonessential foods and beverages
22. Construction trade
23. R&D expenditures of industry: last available figure 1981; data for 1983 estimated.
24. Sources: Federal Reports on Research 1979-1984; Donors' Association of Scientific Statistics; IW calculations.
25. Institute of the German Economy

12114
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SCIENTIFIC AND INDUSTRIAL POLICY

FINLAND'S FIRST INFORMATION TECHNOLOGY CENTER BEGINS OPERATION

Helsinki HELSINGIN SANOMAT in Finnish 16 Jan 85 p 15

[Article: "Information Technology Center Started in Lahti"]

[Text] Lahti--Finland's first information technology center began its operations in Lahti.

In the initial stage, instruction in the fundamentals of information technology, additional training in the field and purely vocational training will be given at the center. Later, the center will broaden its activities to serve enterprises and increase interest in the field of automatic data processing.

The information technology center is a separate unit of Lahti's vocational course center; the state pays 70 percent of its expenses and the city of Lahti the remainder. Three million marks have been invested in the center. The computer equipment is either rented or leased.

Ilkka Kakko, director of Lahti's vocational course center, believes that new technology can be promoted with the center's help. "The center operates in cooperation with the vocational training administration. This way we have been able to eliminate unnecessary costs, and we have at our disposal the information skills of the vocational training administration. Instruction will take place with employment funds at first."

The idea for establishing an information technology center comes from England and France. There are over 100 centers in England. Labor Minister Urpo Leppanen pushed for implementation of the idea.

In the course of a full year, the Lahti center's first course gives 12 students knowledge with the help of which it is believed they will obtain work in small-scale or medium-scale industry.

12327
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SCIENTIFIC AND INDUSTRIAL POLICY

BRIEFS

NETHERLANDS EXTENDS AUTOMATION PROJECTS--The Hague, January 31--The Dutch government last night said it will reserve an extra three million guilders subsidy for its 'Flexible Production-Automatisation' (FPA) programme and extend the programme until April 1. An Economics Ministry spokesman said the government hoped that extending the FPA programme, designed to promote computerised production systems which are not specifically designed for one particular product, would allow more firms to profit from the programme. The FPA programme began in May 1983 with subsidies of 18 million guilders, and expired at the end of last year. The spokesman said firms making use of the programme had been large in the metal-working and electrical engineering sectors, but the government hoped other sectors would now make use of the extension to request subsidy. The programme provides firms applying flexible production-automatisation systems with a 25 percent subsidy for costs up to 750,000 guilders, plus a 25 percent credit at five percent interest, also to a maximum of 750,000 guilders, the spokesman said. [Text] [The Hague ANP NEWSBULLETIN in English 31 Jan 85 p 5]

CSO: 3698/249

TECHNOLOGY TRANSFER

SPANISH 'SECRET DOCUMENT' CITES U.S. DEMANDS ON TECH-TRANSFER

PM211337 Madrid EL PAIS in Spanish 16 Jan 85 p 14

[Carlos Gomez report: "Government Studied in October Possible U.S. Retaliation Because of Refusal To Sign Agreement on Control Over Dual-Use Technologies"]

[Text] Madrid -- The 31 October cabinet meeting discussed a secret document on the Reagan administration's constant pressures to make Spain accept control over reexports to Warsaw Pact countries of high technology made in the United States. The document, drawn up at the Foreign Ministry, gave an account of these pressures and warned the government of a possible toughening of the U.S. policy on technology transfers to our country.

Some 2 months after that cabinet meeting the warnings contained in the report have a reality. President Ronald Reagan has assigned to the Pentagon the authorization for banning of all high technology transfers to our country.

This secret document was published in full detail by the journal ACTUALIDAD ECONOMICA of 29 November and has not so far been denied by the government. It gives an account of the pressures which have been exerted by the United States for 1 and 1/2 years. It reports on the U.S. interest in Spain's joining the Paris-based Consultative Group Cooperation Committee (COCOM).

"The Spanish authorities," the document reports, "stated that Spain could not join COCOM for the present for essentially political reasons." The United States then proposed the signing of a bilateral agreement.

"When the U.S. proposal had been examined," the document continued, "it was decided initially by the Spanish side not to begin negotiations to that end because of the many obstacles and drawbacks of every kind to implementing such an agreement or understanding. In fact, they were not only political problems (introduction of a new form of discrimination against East bloc countries with which economic and industrial cooperation agreements had been signed, possible appraisal by the public of an agreement with the United States on this matter as a step by the government toward military integration into NATO...) but also economic (difficulties in the legal impossibility of accepting the extraterritoriality of U.S. legislation in this matter), and, last,

even administrative (nonexistence of legal instruments in Spain for systematically controlling these exports and financial and human obstacles to the inspection requested by the United States)."

Last September, again according to the document, the U.S. Embassy sent the Foreign Ministry a draft agreement. This specified that Spain should control and inspect the import of a number of products with dual-use technologies (it is suggested that Spain accept COCOM's list of products) and their possible reexport to socialist countries. The document proposed rejecting this proposal for many reasons (extraterritoriality, dependence on other people's decisions, and interference in foreign policy -- Cuba).

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TECHNOLOGY TRANSFER

SPAIN FEELS EFFECTS OF U.S. EXPORT POLICY

PM071635 Madrid YA in Spanish 1 Feb 85 p 5

[Editorial: "Spain and Embargo on Exports to Eastern Bloc"]

[Excerpts] Let us combine two apparently unrelated facts--the fact that Spain is a major importer of technology, and a recent chapter in the development of international tension. The result is a very serious topical problem which our country cannot ignore.

Let us consider the Iron Curtain. Direct military conflicts have been replaced by the thousand-and-one ruses of the cold war. Part of the cold war centers on the issue of the sale to the Eastern bloc of goods described as strategic. The communist economies as a whole, gathered together within CEMA, are at present experiencing a very acute crisis. Following the trials of the suspension of grain sales and the disputes over the Siberian gas pipeline, the foreign debt crisis has made them even more vulnerable. At this very moment, the United States decides to make a further move--and at our expense. A group of 15 governments--the NATO members, less Spain and Iceland, plus Japan--have created in Paris an organization generally called COCOM (Coordinating Committee) devoted to drawing up lists of strategic products which the Western world must not export to the communist world. COCOM controls no more than 5 percent of East-West trade, but it does so almost crudely in certain sectors, especially when it comes to superminicomputers, some kinds of computer software, and telecommunications equipment.

Austria, Switzerland, Sweden and Spain have started to be subjected to very rigorous U.S. pressure to abide by the COCOM embargo measures. ATT's high-technology investment plans in connection with the Spanish National Telephone Company are now on ice unless Spain accepts a bilateral agreement with the United States. The United States claims that this is necessary because Spain, Liechtenstein, Andorra, and San Marino do not have coordinated agreements of this kind. A threat also seems to face the prior agreement on a fiber optics plant that Spain was negotiating with Corning Glass Works--essential to the electronics program which it is planned to set in motion, again based on the Spanish National Telephone Company. Certain cases, such as those concerning Suin and Piher [Spanish firms which reexported U.S. computer ware to Cuba and Bulgaria] are portrayed as being virtually intolerable in U.S. circles.

The Spanish law, which the United States wants us to alter is basically Decree 2343 of 21 September 1973, finalized by the ministerial order of 5 December the same year. It states that our country will not allow clauses in contracts for technology transfers which, among other things, "restrict the purchaser's ability to export."

At the same time the United States adds to its usual bargaining power the fact that it is now Spain's prime supplier of technology: No fewer than 24.5 percent of contracts in this sphere during the period 1974-81 were signed with U.S. companies. At the same time our greed for currency--this most up-to-date version of the "lust for gold"--prompts us to an opening of our borders to foreign capital which should be examined carefully. The resulting increased technological indebtedness--as is at present the case with the threat from Ford--helps to make our own bargaining position very weak. Not to mention the fact--if true--that the Spanish National Telephone Company is to allow foreign ownership of 49 percent of its capital.

The demands of economic dependence and the imperatives of national dignity combine with obligations to our allies and anxieties concerning the future of our exports. Nobody is trying to conceal the fact that even the Council of Ministers is divided. The attempt to combine simultaneous action in different incompatible areas--as is the case with NATO and neutrality--is creating the present confusion, which could be very dangerous. Buridan's ass, which died because it could not choose between water and feed, provides us with an exemplary illustration of this.

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TECHNOLOGY TRANSFER

SWITZERLAND RAISES OBJECTIONS TO NEW U.S. EXPORT CONTROLS

Zurich NEUE ZUERCHER ZEITUNG in German 17 Jan 85 p 13

[Article by "lts," Berne: "U.S. Tightens Export Controls on Strategically Sensitive Goods—Switzerland Being Discriminated Against ?"]

> [Text] Later this month, the U.S. Department of Commerce is expected to come out with more restrictive rules for the issuance of licenses for goods which appear on the Office of Export Administration's commodity control list. Following this rule change, it cannot be ruled out that Switzerland will no longer be able to obtain several licenses at a time but will have to apply for each license individually—which would require more technical and administrative effort and be disadvantageous from a competitive point of view.

Over the weekend, the commerce department announced that the Pentagon will henceforth have more of a voice in the issuance of export licenses for strategically sensitive products, plans and processes. This constitutes a procedural element, made public ahead of time, of a new set of rules dealing with distributor licenses for high-tech exports which, according to well-informed sources, will probably be announced sometime during the month of January.

Preference Being Given to Alliance Partners ?

In contrast to current practice, Switzerland is in danger of no longer being placed on an equal footing with the Cocom nations and being relegated to a discriminatory list of supposedly less reliable or unreliable nations which, in Washington's view, do not satisfy the security policy requirements of strategic export control and whose access to American technology should therefore be restricted. For Swiss industry which depends on this technology this amounts to being placed at a disadvantage from a competitive point of view vis-a-vis its strongest competitors in those West European countries which are members of the Coordinating Committee for Multilateral Export Controls (Cocom).

Switzerland, which does not belong to Cocom but is affected by the decisions of that organization, developed a system of its own more than 30 years ago to help Swiss industry obtain these goods which are designated as strategically important. Since 1951, the Swiss authorities have been issuing import certificates on the basis of which the applicants pledge not to export any such goods imported into Switzerland without permission. In order to be able to control compliance with this rule, a binding requirement for an export permit has been imposed on any goods for which the country of origin has requested a declaration regarding their ultimate destination. Any violation of this rule is punishable under criminal law. In the Berne government's view, this control mechanism and its strict implementation by the appropriate authorities provide for a Swiss foreign trade procedure which makes sure that restrictive trade practices by other exporting countries cannot be circumvented by means of shipments or third-party arrangements using Switzerland as a base.

Members of Government, Ministries Involved in Negotiations

In the intense debate in the United States on export legislation, which has also been marked by security policy considerations it has been the Pentagon in particular which called for restrictive measures in issuing licenses. For months now, there has been a noticeable trend to differentiate among the licensees and, in particular, to classify the non-members of Cocom as being less trustworthy. The foreign trade report adopted by the Bundesrat last week made reference to this trend by stating that "American efforts to strengthen and tighten export controls for strategically important technologies indicate that they might lead to placing Switzerland at a disadvantage vis-a-vis the NATO countries as far as the issuance of American export licenses is concerned." Those responsible for Swiss foreign trade policy have taken this problem up at the government and ministerial level and have also made the Swiss position clear in writing.

During his stay in Washington last February, Bundesrat Furgler voiced the hope that Switzerland would continue to have non-discriminatory access to American technology as long as Switzerland offered guarantees, comparable to those given by other countries, with regard to the reexport of goods to such nations deliveries to which the country of origin would either wish to prevent or restrict. State Secretary Sommaruga of the federal agency for foreign trade also took the occasion of a visit to the United States last fall to present the Swiss case to his conversation partners, including Secretary of Commerce Baldrige among others. At the very end of last year, another round of talks took place in Zurich with a ranking official of the commerce department named Archey.

But based on information available here, Switzerland did not receive any assurances from the American side to the effect that its industry will continue to be able to obtain more than one license at a time.

American Objections

It is said that the effectiveness of the re-export control policy carried out by the Berne government on its own was not questioned. But in the American view the system does have serious deficiencies in that the goods which have slipped out of the control of the country of origin might be removed to Swiss transfer points such as airports or duty-free storage areas at which stage any trace of them very often gets lost. The federal foreign trade agency admits that this is true. In fact, goods located at such transfer points are not subject to the otherwise applicable export regulations and this makes their uncontrolled export to third countries easier. But this loophole could surely be closed without much difficulty.

Certain American agencies wish to see even those strategic commodities which are produced without using Cocom technology included in the Cocom group's technology embargo of the East Bloc countries. This is a far more sensitive matter which can hardly be reconciled with [Switzerland's] neutrality status. In such a case it would no longer be a matter of preventing transactions in circumvention [of restrictions] which are incompatible with Switzerland's neutrality status but a matter of imposing self-restrictive foreign trade measures to the detriment of specific groups of nations in the absence of any third-country request to do so. Such an abrogation of sovereignty would represent a flagrant contradiction of Switzerland's policy of neutrality and would doubtless leave Switzerland open to the charge that she was unilaterally supporting the United States in the technological-economic competition between the two power blocs and was placing the eastern countries at a disadvantage on her market. If the dogmatists in the American administration really do prevail, they will accomplish nothing except to transfer this complex set of problems onto an altogether political plane and on that plane it will be far more difficult to impose pragmatic and mutually agreed upon restrictions on specific flagrant substitution transactions.

Uncertain Consequences

It is impossible to say how a possible denial of collective licenses would affect the individual Swiss industrial firms which are employing American technologies. A lot would depend on the interpretation and implementation of the new regulations by the responsible American authorities. It is not impossible, nor for that matter a foregone conclusion that the tighter regulations might be applied on a product-by-product and a country-to-country basis. Under the best of circumstances, little or nothing would change in the day-to-day licensing procedure in view

of the fact that Switzerland's own export control apparatus would satisfy or at least very nearly approximate the new American security requirements. Under the worst of circumstances, we would have to expect a great deal more red tape, more difficult terms of delivery and disadvantages from the standpoint of competition.

But even if the rules are applied in a broad-minded manner, a factor of uncertainty does remain in that the issuance of every single license would turn into a matter of bureaucratic judgment in the final analysis.

Above all, the **proposed new regulations** are a clear indication of the fact that the Pentagon, which thinks along security lines exclusively and which is exerting a greater influence on the issuance of licenses, will not be satisfied with tighter controls alone but will also intensify the desire of the American authorities to tighten regulations governing transactions across national boundaries. Under the circumstances, the continuation of the conflict between American and Swiss law and the well-known controversy as between the extraterritorial implementation of American law and Swiss legal sovereignty would seem assured.

The federal agency for foreign trade, however, does not rule out the possibility that restricted access to American technology will result in competitive advantages in the longer term because these obstacles will provide an incentive for Swiss industry to create more alternatives outside the United States by coming up with developments of its own and collaborating with third parties. Evidence of the fact that this option does not just amount to wishful thinking is provided by the resistance offered by the American electronics industry against the proposed tightening of export regulations because it fears they will seriously affect their earnings from licensing agreements. But there are of course limits to such efforts to attain independence because Swiss industry will hardly wish to run the risk of disengaging itself from Western technology.

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TECHNOLOGY TRANSFER

FINNISH CHEMICAL FIRM SIGNS LARGE CONTRACT WITH USSR

PM171509 Helsinki HUFVUDSTADSBLADET in Swedish 12 Jan 85 p 20

[Unattributed report: "Kemira Contract Worth 8 Billion Markkas"]

[Text] Yesterday the Kemira Company signed an exchange contract with the Soviet Union worth 8 billion markkas at today's prices. Kemira will supply plant protection agents and seed disinfectants and will buy raw materials and refined chemicals. The agreement will last until the year 2000. Kemira managing director Yrjo Pessi said that deliveries will begin this year. "On Monday we will start designing the new factory, and it will be ready in 1988."

In order to expand its production of plant protection agents Kemira is investing 0.5 billion markkas in a new factory for refined chemicals. It is still not clear where the factory will be located, but Pessi said that Kokkola in Ostrobothnia is thought to be the best alternatives. "We have production in nine locations and sites in others, but for the time being we do not want to mention any alternatives other than Kokkola."

The deal, which is by far the biggest ever between a single company and the Soviet Union, has been prepared in 2 years of intensive negotiations. Kemira invested 43 million markkas in a small factory for refined chemicals, and this has been in use in Kokkola for a year now. The new factory will require 10 times the investment, even though the company is building on the lessons learned from the smaller factory. In addition to seed disinfectants for grain for planting and plant protection agents for sugarbeet, the intention is to expand production to later include chemicals for the mining and paper industries, Pessi said.

The new factory will almost double Kemira's exports to the Soviet Union. The trade will take place in hard currency, but quantities will be determined in advance so that they are more or less equal on both sides. In return for the plant protection agents Kemira will import raw materials for its fertilizer industry from the Soviet Union.

According to Pessi a 15-year contract means considerable advantages for both sides. For Kemira a stable market means that it can confidently begin to expand into other organic products, and for the Soviets it means a continuous outlet for raw materials and semi-refined products.

The products which Kemira will begin to export to the Soviet Union this year are the same as those that have been used for several years in Finnish agriculture.

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TECHNOLOGY TRANSFER

EC CREATES TII TO ACHIEVE ORDERLY TECHNOLOGICAL TRANSFERS

Turin ATA-INGEGNERIA AUTOMOTORISTICA in Italian Aug-Sep 84 p 508

[Text] A flexible structure for the transfer of new technical knowhow and its new markets is a factor of economic growth for the industrialized nations who wish to remain in the vanguard of economic progress.

On the occasion of a symposium jointly organized by the Council of Europe and the Commission of the European Community (Strasburg 26-28 May 1982), the participants recommended the founding of a European society for the transfer of industrial information in the scientific, technical, commercial and juridical fields. For example it should be able to
-stimulate innovation, in particular with respect to small and medium sized business;
-accelerate the transfer of technology;
-assist especially small and medium-sized business to take advantage of the possibilities offered by a common market;
-contribute, through the encouragement of personal contacts, to a consolidation of the growth of the small and medium-sized business sector, which is of such great economic importance.

These are objectives laid down in the draft statutes of the newly constituted TII, the European society for the transfer of industrial information. It will be established with the assistance of the DG XIII (Information and innovation market) of the Commission of the EEC, but as a private, non-profit association under Luxemburg law. Some other objectives set forth in the Association program which will receive financial support from the Commission are:
-the organization of group visits to various countries of the community to enable the members who so desire to familiarize themselves with work-methods outside their own countries, and to establish preliminary trans-national contacts;
-an exchange network of exploitable technologies among the TII agencies of the various countries (a pilot project is presently underway).

The constitutive meeting of the association was held in Luxemburg in the spring of 1984. Agencies, persons and interested parties operating in the regional, national and European sectors of technology transfer and innovative techniques with head offices in the community were invited.

For further information: TII a.s.b.l., Dr. Christian Glockner, 7 rue Alcide de Gasperi, Boite postale 1704, L-1017 Luxemburg-Kirchberg; tel. 43.80.96.

(Excerpt from "La Revista dei Combustibili, 1984.01,vol.38,n.1).

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TECHNOLOGY TRANSFER

BRIEFS

CHINA BUYS FRENCH COMPUTER HARDWARE--Beijing--A contract for the supply of computerized surveillance equipment and assistance for the exploitation of the future Qinshan nuclear power station (with a capacity of 300 megawatts) was signed at the end of December by CERCI, the computer development company (a subsidiary of Jeumont-Schneider), and the China Nuclear Energy Industry Corporation. This contract will cover 4 years and include an extended cooperation program. The technology exported is the direct result of the development of the French nuclear program. A contract had already been signed with Framatome for the instrumentation of the central part of the power station, and other negotiations are under way. This agreement comes on the eve of the official creation on Friday, 18 January, of the joint "Sino-Hong Kong" company responsible for the Daya Bay nuclear power station near Hong Kong. Negotiations should be resumed shortly between the new joint company and the Franco-British group responsible for constructing this 900-megawatt power station, Framatome being responsible for the nuclear complex and the French Electricity Company for technical management. [Text] [Paris LE MONDE in French 19 Jan 85 p 19]

SWEDISH MACHINE TOOL KNOW-HOW TO USSR--(TIDNINGARNAS TELEGRAMBYRA, Sandviken) Sandvik International has received an order from the Soviet automobile industry worth 50 million kronor. It is for machine-tool production at the VAS factory in Toglatti, located about 100 miles east of Moscow, which is going to be modernized. The contract, the largest ever for Sandvik, involves Sandvik selling technical know-how and assistance in starting production. Sandvik will also train Russian personnel in the West this year and the next. The work is to commence this year and the contract will extend until 1988. [Text] [Stockholm DAGENS NYHETER in Swedish 15 Jan 85 p 9]

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